

VOLUME 77 PART 3

DECEMBER 1978

ISSN 0303-2515

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ANNALS

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1. MATERIAL should be original and not published elsewhere, in whole or in part.

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Title: informative but concise, without abbreviations and not including the names of new genera or species
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- (b) *Abstract* of not more than 200 words, intelligible to the reader without reference to the text
- (c) *Table of contents* giving hierarchy of headings and subheadings
- (d) *Introduction*
- (e) *Subject-matter* of the paper, divided into sections to correspond with those given in table of contents
- (f) *Summary*, if paper is lengthy
- (g) *Acknowledgements*
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3. MANUSCRIPT, to be submitted in triplicate, should be typewritten and neat, double spaced with 2.5 cm margins all round. First lines of paragraphs should be indented. Tables and a list of legends for illustrations should be typed separately, their positions indicated in the text. All pages should be numbered consecutively.

Major headings of the paper are centred capitals; first subheadings are shouldered small capitals; second subheadings are shouldered italics; third subheadings are indented, shouldered italics. Further subdivisions should be avoided, as also enumeration (never roman numerals) of headings and abbreviations.

Footnotes should be avoided unless they are short and essential.

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5. REFERENCES cited in text and synonymies should all be included in the list at the end of the paper, using the Harvard System (*ibid.*, *idem*, *loc. cit.*, *op. cit.* are not acceptable):

(a) Author's name and year of publication given in text, e.g.:

- 'Smith (1969) describes ...'
'Smith (1969: 36, fig. 16) describes ...'
'As described (Smith 1969a, 1969b; Jones 1971)'
'As described (Haughton & Broom 1927) ...'
'As described (Haughton *et al.* 1927) ...'

Note: no comma separating name and year
pagination indicated by colon, not p.
names of joint authors connected by ampersand
et al. in text for more than two joint authors, but names of all authors given in list of references.

(b) Full references at the end of the paper, arranged alphabetically by names, chronologically within each name, with suffixes *a*, *b*, etc. to the year for more than one paper by the same author in that year, e.g. Smith (1969a, 1969b) and not Smith (1969, 1969a).

For books give title in italics, edition, volume number, place of publication, publisher.

For journal article give title of article, title of journal in italics (abbreviated according to the *World list of scientific periodicals*, 4th ed. London: Butterworths, 1963), series in parentheses, volume number, part number (only if independently paged) in parentheses, pagination (first and last pages of article).

Examples (note capitalization and punctuation)

- BULLOUGH, W. S. 1960. *Practical invertebrate anatomy*. 2nd ed. London: Macmillan.
FISCHER, P.-H. 1948. Données sur la résistance et de la vitalité des mollusques. *J. Conch.*, Paris 88: 100-140.
FISCHER, P.-H., DUVAL, M. & RAFFY, A. 1933. Études sur les échanges respiratoires des littorines. *Archs Zool. exp. gén.* 74: 627-634.
KÖHN, A. J. 1960a. Ecological notes on *Conus* (Mollusca: Gastropoda) in the Trincomalee region of Ceylon. *Ann. Mag. nat. Hist.* (13) 2: 309-320.
KÖHN, A. J. 1960b. Spawning behaviour, egg masses and larval development in *Conus* from the Indian Ocean. *Bull. Bingham oceanogr. Coll.* 17 (4): 1-51.
THIELE, J. 1910. Mollusca: B. Polyplacophora, Gastropoda marina, Bivalvia. In: SCHULTZE, L. *Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Süd-Afrika* 4: 269-270. Jena: Fischer. *Denkschr. med.-naturw. Ges. Jena* 16: 269-270.

(continued inside back cover)

ANNALS OF THE SOUTH AFRICAN MUSEUM
ANNALE VAN DIE SUID-AFRIKAANSE MUSEUM

Volume 77 Band
December 1978 Desember
Part 3 Deel



REDESCRIPTION OF *PLIOPLATEIA* K. H. BARNARD,
A GENUS OF AMPHIPOD (CRUSTACEA) FROM
SOUTH AFRICA

By

J. LAURENS BARNARD

Cape Town Kaapstad

The ANNALS OF THE SOUTH AFRICAN MUSEUM

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Die ANNALE VAN DIE SUID-AFRIKAANSE MUSEUM

word uitgegee in dele op ongereelde tye na beskikbaarheid
van stof

Verkrygbaar van die Suid-Afrikaanse Museum, Posbus 61, Kaapstad 8000

OUT OF PRINT/UIT DRUK

1, 2(1-3, 5-8), 3(1-2, 4-5, 8, t.-p.i.), 5(1-3, 5, 7-9),
6(1, t.-p.i.), 7(1-4), 8, 9(1-2, 7), 10(1-3),
11(1-2, 5, 7, t.-p.i.), 15(4-5), 24(2), 27, 31(1-3), 32(5), 33

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Kopieregnavrae na die Suid-Afrikaanse Museum

ISBN 0 908407 60 2

Printed in South Africa by
The Rustica Press, Pty., Ltd.,
Court Road, Wynberg, Cape

In Suid-Afrika gedruk deur
Die Rustica-pers, Edms., Bpk.,
Courtweg, Wynberg, Kaap

REDESCRIPTION OF *PLIOPLATEIA* K. H. BARNARD,
A GENUS OF AMPHIPOD (CRUSTACEA) FROM SOUTH AFRICA

By

J. LAURENS BARNARD

Department of Invertebrate Zoology, Smithsonian Institution, Washington

(With 4 figures)

[MS. accepted 12 September 1978]

ABSTRACT

Plioplateia K. H. Barnard (1916) is removed from Phliantidae to form the type genus of a new family demonstrating evolutionary outflow from the southern Pacific family Ceinidae towards the circumtropical family Phliantidae. At least nine major characters constrain *Plioplateia* from assignment to Phliantidae. *Plioplateia* appears to be the last living relict of what may have been a diverse group of taxa standing between ceinids and phliantids. It joins many other South African amphipods now considered to be relicts.

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INTRODUCTION

Plioplateia, a gammaridean amphipod, was described by K. H. Barnard (1916) and placed in the family Phliantidae. Since that time many genera in this evolutionary vicinity have been described and then later realigned, mainly by J. L. Barnard (1972*a*, 1972*b*) and Griffiths (1975), into families Phliantidae, Temnophliidae, Kuriidae and Ceinidae, with subfamily Chiltoniinae. *Plioplateia* appears to stand between Ceinidae and Phliantidae but differs in so many ways from either family group that a new family is established for *Plioplateia*. All of these families are included in the superfamily Talitroidea.

The Plioplateidae join the Temnophliidae of South Africa as the narrowest relict families known in the Gammaridea except for the Kuriidae from Abd-el-Kuri near the Gulf of Aden. South Africa is noted for other isolated or relict amphipods, mainly the genera *Calliopiella* Schellenberg, *Cypsiphimedia* K. H. Barnard, *Dikwa* Griffiths, *Triodos* K. H. Barnard, *Hoplopleon* K. H. Barnard, *Exampithoe* K. H. Barnard, *Macropisthopus* K. H. Barnard, *Unciolella* Chevreux, *Elasmopoides* Stebbing, *Cunicus* Griffiths and *Phoxostoma* K. H. Barnard.

Plioplateidae fam. nov.*Type genus*

Plioplateia K. H. Barnard, 1916.

Diagnosis

Talitroidea with laterally compressed tall, cuspidate bodies but coxae poorly splayed and excavate or cuspidate; coxa 4 small. Cuticle humped and rough. Head dorsoventrally compressed, complexly cuspidate. Antennae disparate, cuspidate, flagella elongate. Anterior part of body dorsally cuspidate. Mandibular molar huge, granular, not distinctly triturative. Inner lobes of lower lip well developed. Outer plate of maxilla 1 with eight spines. Inner plate of maxilla 2 much narrower and shorter than outer. Outer plate of maxilliped not larger than inner plate, palp articles 1 and 4 elongate, palp thin.

Gnathopods subchelate, hands expanded, lacking giant facial setae. Article 2 of pereopods 5–7 narrow, small.

Pleon small, deeply flexed below thorax, urosomite 3 distinct but vestigial. Pleopods elongate, peduncles thin, rami elongate, thin, uni-articulate. Uropod 3 formed of leaf-like peduncle lacking ramus. Telson forming erect cowl, deeply cleft.

Relationship

On first sight *Plioplateia* appears to belong to the Phliantidae as originally placed by K. H. Barnard, but *Plioplateia* differs from phliantids in the elongate flagella of the antennae, the elongate, thin pleopods with equal and uniarticulate rami, the giant mandibular molar, the presence of well-developed inner lobes on the lower lip, the small inner plate of maxilla 2, the small outer plate of the maxilliped, the thin maxillipedal palp with elongate article 1, the subchelate gnathopods lacking giant setae, and the cowl-like cleft telson. *Plioplateia* bears the bidentate pereonite 1 similar to that of many phliantids but would appear to be much more primitive and to share many features of the plesiomorphic Ceinidae (see J. L. Barnard, 1972a, 1972b). To a great extent *Plioplateia* fits many aspects of a model ancestor to phliantids with evolutionary outflow from ceinids, and, in addition, its isolation in South Africa fits the role of a relict.

Plioplateia shares the tall body and subchelate gnathopods of ceinids, and in many other characters (to follow) appears to have a foundation in *Taihape* J. L. Barnard (1972a) or *Waitomo* J. L. Barnard (1972a): size and flagellar condition of antennae in *Waitomo*; posterior dorsal cuspidation of *Waitomo*; molar of *Waitomo*; outer plate of maxilla 1 in both genera; maxillipedal palp of *Taihape*; gnathopods (less giant setae) and telson of either genus.

Plioplateia differs from Ceinidae in the dorsoventrally depressed head with complex cuspidation, the anterodorsal body cuspidation, the cuspidation and excavation of coxae and antennae, the special form of maxilla 2, the lack of

large setae on the gnathopods and the presence of inner lobes on the lower lip, wholly unique to *Plioplateia* in the Ceinid-Phliantid scheme.

The reduction in segmentation on the pleopods suggests that *Plioplateia* has progressed far from a perfect intergrade between ceinids and phliantids and this is also supported by the extra cuspidation on the head and coxae, the development of inner lobes on the lower lip, the reduction in size of the inner lobe on maxilla 1 and the outer plate of the maxilliped, the enlargement of the molar, the loss of giant setae on the gnathopods. The brood plates appear to be much larger than in ceinids and phliantids whereas the gills are much smaller. The weakly developed multispination on the apices of uropods 1-2 would appear to be a remnant of ancestry in ceinids where these spines are well developed.

The Kuriidae, composed only of *Kuria* Walker & Scott (1903), from Abd-el-Kuri, appear also to be in a level of evolution similar to *Plioplateia*. For example, the gnathopods of *Kuria* are subchelate, though weakly, the palms being almost transverse, and the outer plate of the maxilliped is small as in *Plioplateia*. Plioplateidae differ from Kuriidae in the ornamentation of the head, body and coxae, the small coxa 4, small article 2 of pereopods 5-7, expanded hands of the gnathopods, the disparity in sizes of antennae, and the extremely large mandibular molar. In minor ways, Plioplateidae differ from Kuriidae in the larger dactyls of the maxillipeds, and the absence of a ramus on uropod 3. Pleopods, maxillae and lower lip have not been reported for *Kuria*.

Plioplateia K. H. Barnard

Plioplateia K. H. Barnard, 1916: 155.

Type species

Plioplateia triquetra K. H. Barnard, 1916 (monotypy).

Diagnosis

With the characters of the family.

Description

Rostrum well developed, erect, thorn-like, bearing bilateral subsidiary tooth. Antenna 1 much longer than antenna 2, flagella of both pairs highly articulate, those of antenna 1 bearing 1-2 aesthetascs each. Epistome rounded anteriorly, upper lip deeply incised, asymmetrical. Mandibular incisor well toothed, right lacinia mobilis, if present, composed of three fused spines (or these actually rakers and lacinia mobilis absent), left lacinia mobilis large and well toothed, left mandible with three raker spines; molar very large, broad, blunt, tumid, poorly tritulative, mainly granular apically; palp absent or possibly represented by small leaf. Lower lip with well-developed inner lobes. Outer plate of maxilla 1 with eight spines, palp uniarticulate, of medium size, bearing one medium apical seta. Inner plate of maxilla 2 much shorter and

narrower than outer, inner subconical, outer subrectangular, both poorly setose but inner with one medial and outer with two lateral setae. Inner plate of maxillipeds leaf-like, with tapered base, poorly armed, outer plates as large as inner; palp thin, article 1 elongate, article 4 unguiform, greatly elongate, with three apical setae. Pleurae of pereonites produced, rugose, humped or cuspidate.

Plioplateia triquetra K. H. Barnard

Figs 1-4

Plioplateia triquetra K. H. Barnard, 1916: 156, pl. 26 (figs 18-24); Griffiths, 1974: 328.

Diagnosis

With the characters of the family and genus.

Description

Head depressed but with erect thorn-like, rostrum with smaller basal tooth on each side, lateral lobes with weak dorsal and strong ventral tooth, middle of lobe bulging laterally and containing small but multifaceted ommatidial eye, antenna 1 inserted by sleeve into pocket anterior to ocular lobe, anteroventral area of head extended forward through fusion of articles 1 and 2 of antenna 2, lateral surface of article 2 with large cusp, article 3 also with large lateral cusp, gland cones emerging ventrally from fused article 2. Mouthpart field from lateral view, apart from maxillipeds, dominated by outer surface of lower lip.

Antenna 1 elongate, articles 1 and 2 cuspidate, article 3 shorter than article 1 of flagellum, latter 12-articulate, each article of flagellum with 1-2 aesthetascs and several curled setae. Accessory flagellum absent but marked by weak sinuate stripes inside of article 3. Antenna 2 small and slender, article 4 weakly cuspidate, article 5 slightly longer than article 4 of peduncle on article 1 of flagellum, latter 9-articulate, with short stiff curled setae.

Upper lip scarcely distinct from epistome, together rounded anteriorly, upper lip deeply bilobed. Each mandibular molar with large setule, right incisor with 8-9 teeth, left with 3, left lacinia mobilis with 7 teeth, right either absent or formed of 3 fused spines, left mandible with 3 distinct rakers each independent and mostly fused to mandible. Mandibular lobes of lower lip well developed, inner lobes distinct, thin across faces, broad, widely separating outer lobes. Inner plate of maxilla 1 linguiform, of medium size.

Wrist of gnathopod 1 longer than hand, shorter on gnathopod 2, neither lobate, palm well developed, oblique, defined by pair of spines, armed with pairs of wire-setules.

Coxa 1 apically expanded, with deep posteroventral notch, coxae 2-4 somewhat tapered, each with weak or moderate notch, coxa 4 smaller than coxa 1, not excavate posteriorly; coxae 5-7 short, coxae 5 and 7 bilobed and acuminate, coxa 6 trilobed and acuminate.

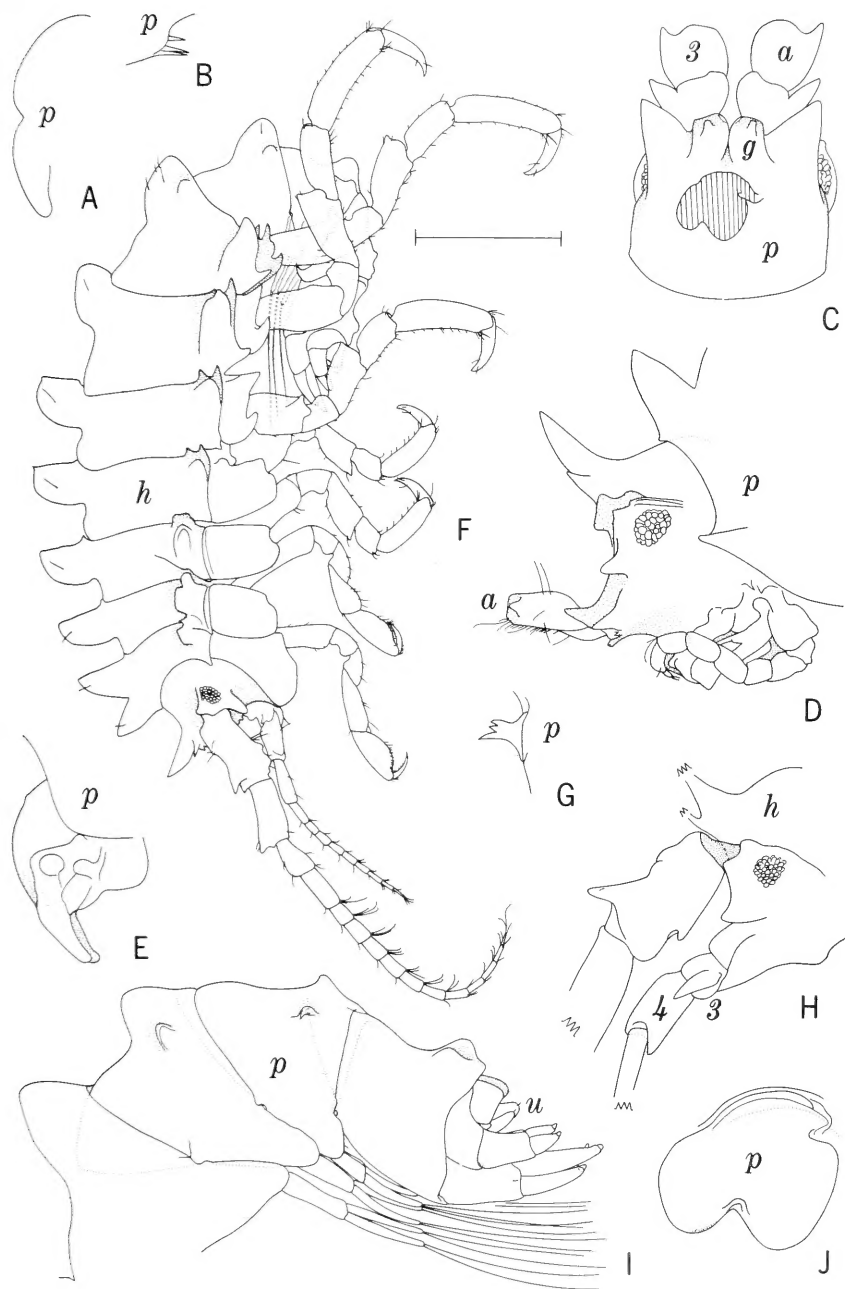


Fig. 1. *Plioplateia triquetra* K. H. Barnard. h, holotype, female 'h' unmeasured; p, male 'p' 5.72 mm. A. Prebuccal outline, left lateral. B. left mandibular rakers. C. Ventral view of head, upper lip hatched; a, antenna 2, g, gland cone. D. Head, lateral; a, antenna 2 broken off. E. Prebuccal, left lateral. F. Body, scale = 1 mm. G. Right mandibular rakers. H. Head. I. Pleon, left lateral; u, uropod 3. J. Upper lip, anterior.

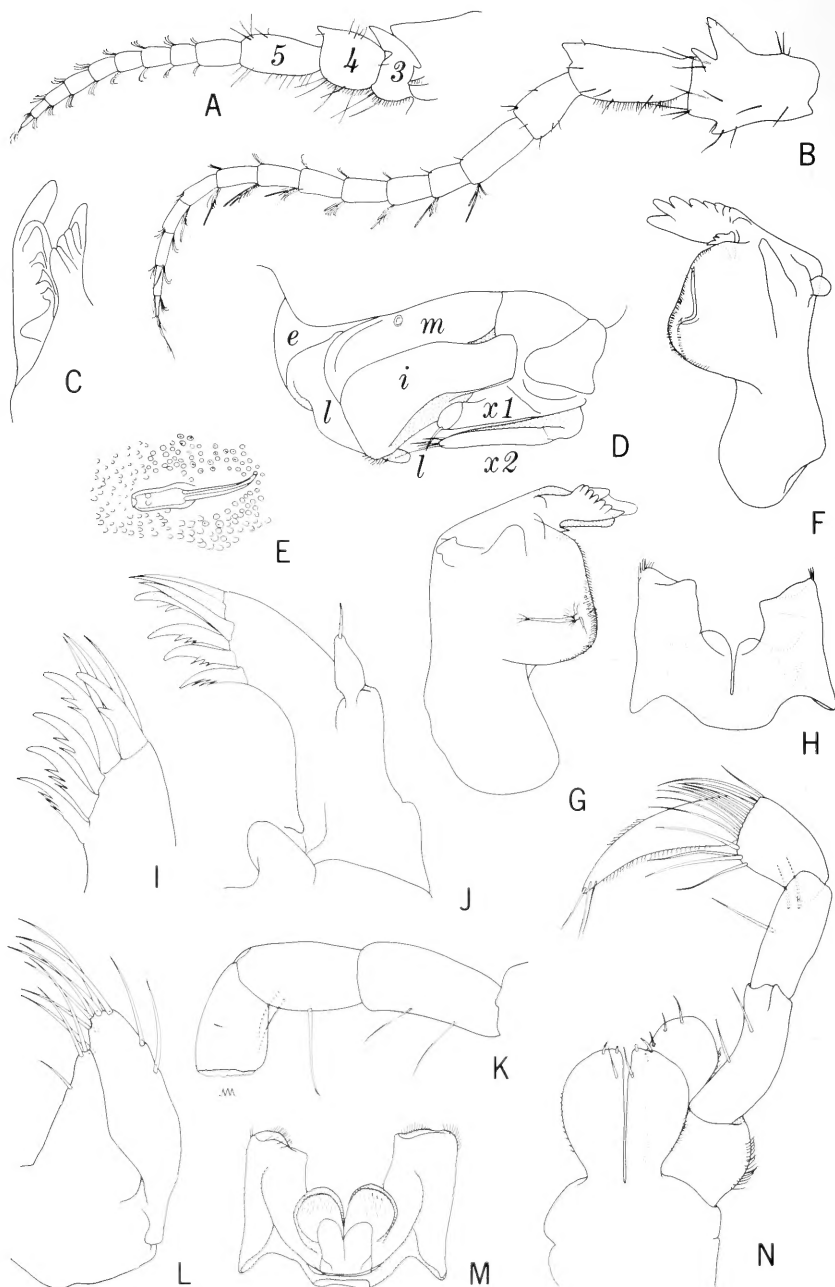


Fig. 2. *Plioplateia triquetra* K. H. Barnard, male 'p' 5.72 mm. A. Antenna 2. B. Antenna 1. C. Left mandible. D. Mouthparts, left side; e, epistome, i, lower lip, l, upper lip, m, mandible, x, maxilla. E. cuticle. F. Right mandible. G. Left mandible. H. Lower lip, oral side. I. Outer plate of maxilla 1. J. Maxilla 1. K. Palp of maxilliped, flattened. L. Maxilla 2. M. Lower lip, aboral side. N. Maxilliped.

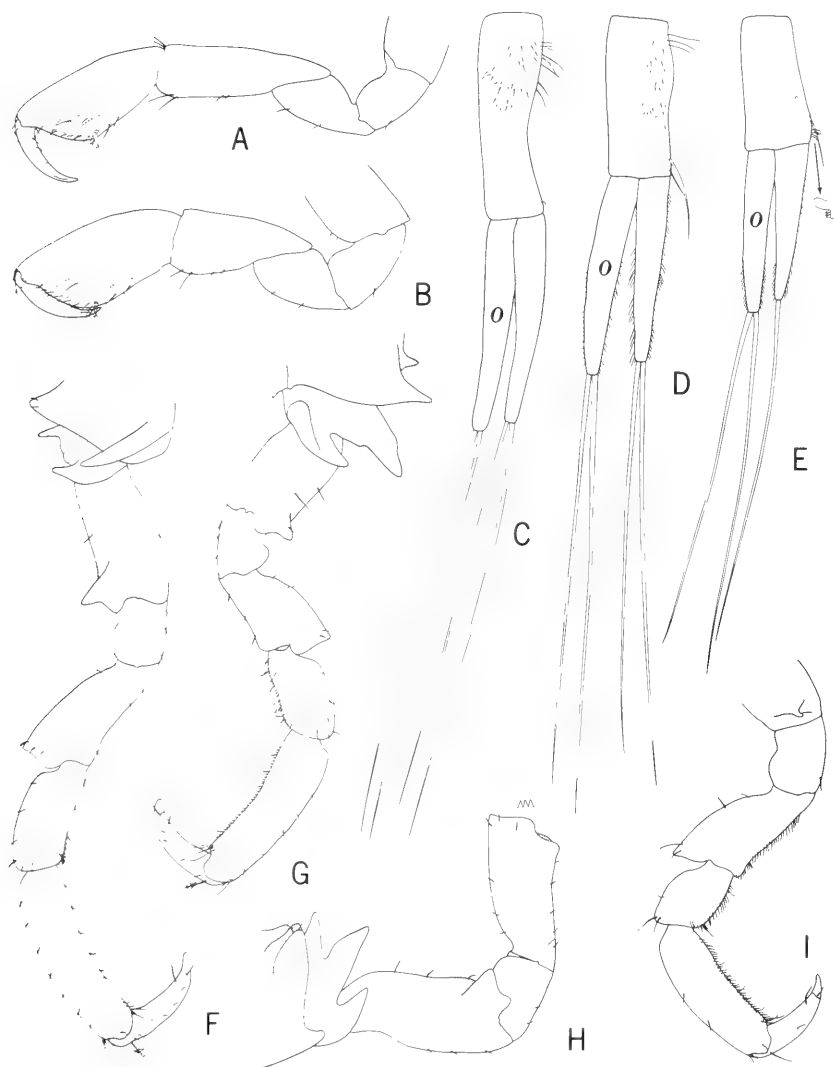


Fig. 3. *Plioplateia triquetra* K. H. Barnard. male 'p' 5.72 mm, o, outer ramus. A. Gnathopod 1. B. Gnathopod 2. C. Pleopod 1, rear. D. Pleopod 2, rear. E. Pleopod 3, rear. F. Pereopod 7. G. Pereopod 5. H. Pereopod 6. I. Pereopod 4.

Article 2 of pereopods 3–4 uncuspidate, that of pereopods 5–7 with bicuspidate posteroventral process; defining armaments on article 6 composed of setae. Coxal gills very small, attached to segments 2–6, somewhat triquetral (see appendages attached to figures of coxae 2–4). Brood plates very large, lamellar, attached to coxae 2–5, densely furnished with coil-tipped setae. Male penes of pereonite 7 highly lateral, just basal to coxae, very elongate and sausage-shaped.

Epimera tapering distally, poorly armed and unornamented. Pleopods tightly clumped, decreasing in size from front to rear slightly, inner rami scarcely shortened, each with 2 apical setae longer than ramus, except inner ramus of pleopod 3 with only one apical seta, peduncles elongate, only pleopod 3 with pair of apicomedial coupling spines.

Urosomite 3 vestigial, represented only by ventral plate, telson on dorsal side appearing attached directly to urosomite 2, telson formed of bifid cowl lacking macroscopic armament. Uropods 1–2 short, stout, poorly armed, outer

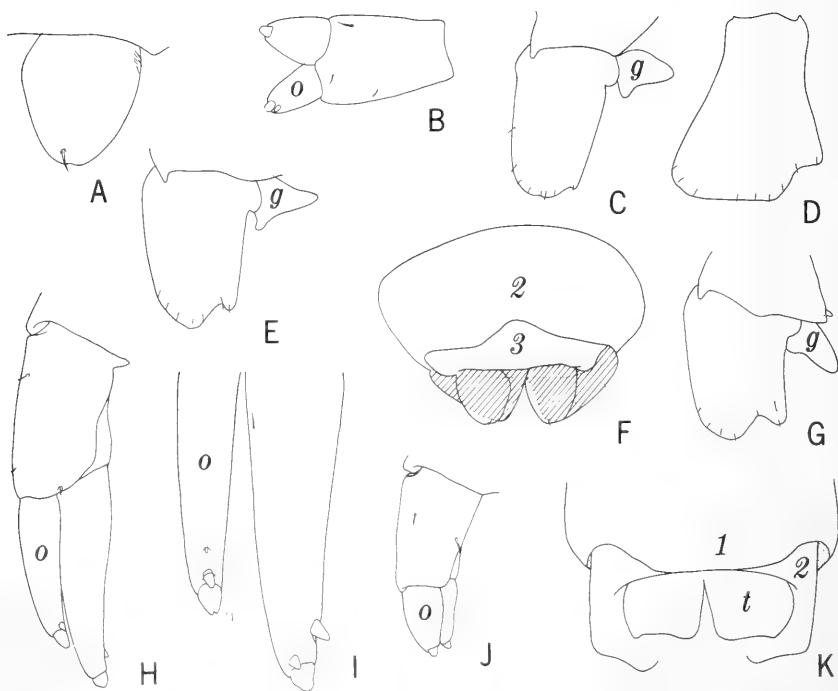


Fig. 4. *Plioplateia triquetra* K. H. Barnard, male 'p' 5.72 mm, g, gill, o, outer ramus. A. Uropod 3. B. Uropod 2. C. Coxa 2. D. Coxa 1. E. Coxa 3. F. Pleonite 6, ventral, telson hatched. G. Coxa 4. H. Uropod 1. I. Uropod 1, rami enlarged. J. Uropod 2. K. Pleonites 1–2 dorsal showing telson, t.

ramus of uropod 1 shortened, each ramus of both uropods with apical jewel-nail plus accessory spine except on inner ramus of uropod 2, inner ramus of uropod 1 with third spine fixed subapically. Uropod 3 ovate, bearing weak apical spinule.

Cuticle densely pebbled, each pebble usually complex, either with apparent pit or appearing ring-shaped (with central vacuole) bulbar setules sparse, pipes often abundant; no pits typical of ceinids have been observed.

Pereonite 1 with large tooth dorsally, remaining pereonites each with single tooth or hump, pleonites 1–3 each with increasingly smaller dorsal hump, urosomite 1 with slightly larger hump, this segment covering urosomites 2–3 dorsally; pereonites 1–7 from front to rear with increasingly complex distolateral rugosities or cusps.

Holotype

South African Museum A174, female 'h' (not measured to prevent damage) lacking right antennae, uropods 2–3, telson, right uropod 1.

Other material

South African Museum, University of Cape Town SCD 310 F, male 'p' 5.72 mm (dissected and illustrated herein).

Distribution

South Africa, 50–91 m.

ACKNOWLEDGEMENTS

I thank Dr C. L. Griffiths of the C.S.I.R. Oceanographic Research Unit, University of Cape Town, for locating this material, and Dr T. H. Barry Director of the South African Museum, for his kind assistance. Carolyn L. Cox of Smithsonian Institution inked and prepared the illustrations for publication; she also created several of the original drawings.

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- WALKER, A. O. & A. Scott. 1903. Decapod and sessile-eyed crustaceans from Abd-el-Kuri. *Nat. Hist. Sokotra and Abd-el-Kuri*: 216–232.

6. **SYSTEMATIC** papers must conform to the *International code of zoological nomenclature* (particularly Articles 22 and 51).

Names of new taxa, combinations, synonyms, etc., when used for the first time, must be followed by the appropriate Latin (not English) abbreviation, e.g. gen. nov., sp. nov., comb. nov., syn. nov., etc.

An author's name when cited must follow the name of the taxon without intervening punctuation and not be abbreviated; if the year is added, a comma must separate author's name and year. The author's name (and date, if cited) must be placed in parentheses if a species or subspecies is transferred from its original genus. The name of a subsequent user of a scientific name must be separated from the scientific name by a colon.

Synonymy arrangement should be according to chronology of names, i.e. all published scientific names by which the species previously has been designated are listed in chronological order, with all references to that name following in chronological order, e.g.:

Family Nuculanidae

Nuculana (Lembulus) bicuspidata (Gould, 1845)

Figs 14–15A

Nucula (Leda) bicuspidata Gould, 1845: 37.

Leda plicifera A. Adams, 1856: 50.

Laeda bicuspidata Hanley, 1859: 118, pl. 228 (fig. 73). Sowerby, 1871: pl. 2 (fig. 8a–b).

Nucula largillierti Philippi, 1861: 87.

Leda bicuspidata: Nickles, 1950: 163, fig. 301; 1955: 110. Barnard, 1964: 234, figs 8–9.

Note punctuation in the above example:

comma separates author's name and year

semicolon separates more than one reference by the same author

full stop separates references by different authors

figures of plates are enclosed in parentheses to distinguish them from text-figures

dash, not comma, separates consecutive numbers

Synonymy arrangement according to chronology of bibliographic references, whereby the year is placed in front of each entry, and the synonym repeated in full for each entry, is not acceptable.

In describing new species, one specimen must be designated as the holotype; other specimens mentioned in the original description are to be designated paratypes; additional material not regarded as paratypes should be listed separately. The complete data (registration number, depository, description of specimen, locality, collector, date) of the holotype and paratypes must be recorded, e.g.:

Holotype

SAM–A13535 in the South African Museum, Cape Town. Adult female from mid-tide region, King's Beach Port Elizabeth (33°51'S 25°39'E), collected by A. Smith, 15 January 1973.

Note standard form of writing South African Museum registration numbers and date.

7. SPECIAL HOUSE RULES

Capital initial letters

- (a) The Figures, Maps and Tables of the paper when referred to in the text
e.g. '... the Figure depicting *C. namacolus* ...'; '... in *C. namacolus* (Fig. 10) ...'
- (b) The prefixes of prefixed surnames in all languages, when used in the text, if not preceded by initials or full names
e.g. Du Toit but A. L. du Toit; Von Huene but F. von Huene
- (c) Scientific names, but not their vernacular derivatives
e.g. Therocephalia, but therocephalian

Punctuation should be loose, omitting all not strictly necessary

Reference to the author should be expressed in the third person

Roman numerals should be converted to arabic, except when forming part of the title of a book or article, such as

'Revision of the Crustacea. Part VIII. The Amphipoda.'

Specific name must not stand alone, but be preceded by the generic name or its abbreviation to initial capital letter, provided the same generic name is used consecutively.

Name of new genus or species is not to be included in the title: it should be included in the abstract, counter to Recommendation 23 of the Code, to meet the requirements of Biological Abstracts.



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